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EXAMINER	
LAVIN, CHRISTOPHER L	
ART UNIT	**PAPER NUMBER**
2621	

DATE MAILED: 06/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/072,355	SATHYANARAYANA, SHASHIDHAR	
	Examiner	Art Unit	
	Christopher L. Lavin	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *29 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 – 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Scampini (5,989,191).

3. In regards to claim 1, Scampini discloses a method for reducing Nonuniform Rotational Distortion (NURD, i.e., non-uniformity in the angular velocity), in an image, said image comprising a plurality of image vectors, each image vector having texture and each image vector being mapped to an angle in the image (col. 4, lines 13 – 23; col. 1, lines 31 – 35: An IVUS composed image comprises of a plurality of image vectors, contained within the image vectors are textures representing areas of reflection of the ultrasound wave. For an IVUS image to be put together the angles each image vector is obtained at inherently must be recorded for the method to work, this is a way of mapping each image vector to an angle.), the method comprising:

Computing an average, i.e., mean, frequency of the texture for each image vector (col. 7, lines 40 – 43; col. 5, lines 12 – 18: In this case the texture used is the tip of the catheter the transducer is contained within);

Estimating an angle (the percentage difference between velocities is an estimate of angle) for each image vector based on the average, i.e., mean, frequency for the respective image vector (col. 8, lines 44 – 49);

Remapping each image vector to the estimated angle for the respective image vector (col 4., 35 – 37).

4. In regards to claim 2, Scampini discloses the method of claim 1, wherein each image vector comprises a plurality of pixels, each pixel representing the amplitude of an echo pulse reflected from a certain image depth (col. 1, lines 31 – 35: An IVUS composed image comprises of a plurality of image vectors, contained within the image vectors are textures representing areas of reflection of the ultrasound wave.).

5. In regards to claim 3, Scampini discloses the method of claim 2, wherein the step of computing the average, i.e., mean, frequency for each image vector further comprises:

Computing a mean frequency of the texture for each pixel in each image vector (col. 6, line 66 – col. 7 line 8: Scampini essentially takes two image vectors for each angle. Scampini first takes an image vector where the pixels only represent the first reflection point, the catheter, the second image vector is the entire image. Scampini uses the first image vector to correct for NURD. The only pixels in the first image vector are those representing the catheter; col. 7, lines 40 – 43); and

Computing an average of the mean frequency for the pixels in each image vector (col. 7, lines 40 – 43: As Scampini only uses one texture for correcting NURD the mean of the texture is the average of the mean frequency for the pixels.).

6. In regards to claim 4, Scampini discloses performing a Fourier transform in the paragraph starting at column 7, line 22. In the next paragraph Scampini discloses computing a mean of the frequency signal resulting from the transform.

7. In regards to claims 5 and 7, Scampini discloses the method of claim 1 and 3 (respectively), wherein the step of estimating the angle for each image vector further comprises:

Computing an integral, i.e. sum, of the average frequency for all of the image vectors (col. 8, lines 21 – 23: An integral is nothing more then a sum over a predetermined interval.)

Normalizing the integral, i.e. sum, to a predetermined value (col. 8, lines 21 – 23: "One full revolution" requires the predetermined value to be 360 degrees or 2π radians); and

Estimating the angle for the each image vector based on the value of the normalized integral at the respective image vector (col. 8, lines 43 – 49).

8. In regards to claims 6 and 8, Scampini discloses the method of claim 5, wherein the predetermined value is 2π radians (col. 8, lines 21 – 23: "One full revolution" requires the predetermined value to be 360 degrees or 2π radians).

9. In regards to claim 9, Scampini discloses in the paragraph starting at column 8, line 58 that the method disclosed in claims 1 – 8 can be implemented in software. Claim 9 is rejected for the same reasons as those used to reject claim 1. The argument is analogous to that presented above for claim 1, and therefore the rejection to claim 1 is equally applicable to claim 9.

10. In regards to claim 10, claim 10 is rejected for the same reasons as those used to reject claim 2. The argument is analogous to that presented above for claim 2, and therefore the rejection to claim 2 is equally applicable to claim 10.

11. In regards to claim 11, claim 11 is rejected for the same reasons as those used to reject claim 3. The argument is analogous to that presented above for claim 3, and therefore the rejection to claim 3 is equally applicable to claim 11.

12. In regards to claim 12, claim 12 is rejected for the same reasons as those used to reject claim 4. The argument is analogous to that presented above for claim 4, and therefore the rejection to claim 4 is equally applicable to claim 12.

13. In regards to claim 13, claim 13 is rejected for the same reasons as those used to reject claim 5. The argument is analogous to that presented above for claim 5, and therefore the rejection to claim 5 is equally applicable to claim 13.

14. In regards to claim 14, claim 14 is rejected for the same reasons as those used to reject claim 6. The argument is analogous to that presented above for claim 6, and therefore the rejection to claim 6 is equally applicable to claim 14.

15. In regards to claim 15, parts c.i – iv have already been shown in the rejection of claim 9. Scampini discloses an IVUS system in lines 31 – 35, col. 1, which is used for medical imaging.

A processor (figure 7, item 28)

An interface to receive data for the processor to use to create a medical image (figure 7, transducer (18) is shown to have a data path to the processor)

16. In regards to claim 16, Scampini discloses the medical imaging system of claim 15 further comprising a display to display the output image (col. 10, line 3).

17. In regards to claim 17, Scampini discloses the medical imaging system of claim 15 comprising a printer to print the output image (col 10, lines 3 – 4).

18. In regards to claim 18, Scampini discloses the medical imaging system of claim 15 further comprising:

A catheter (figure 1 item 24); and

An ultrasound transducer mounted on the cather, the ultrasound transducer to be rotated by a motor, the ultrasound transducer to emit ultrasound waves and to receive reflected ultrasound waves, the ultrasound transducer to send reflected ultrasound waves to the interface (figure 1 ultrasound transducer 18 and motor 22; col. 3, lines 55 – 59)

19. In regards to claim 19, claim 19 is rejected for the same reasons as those used to reject claim 2. The argument is analogous to that presented above for claim 2, and therefore the rejection to claim 2 is equally applicable to claim 19.

20. In regards to claim 20, claim 20 is rejected for the same reasons as those used to reject claim 3. The argument is analogous to that presented above for claim 3, and therefore the rejection to claim 3 is equally applicable to claim 20.

21. In regards to claim 21, claim 21 is rejected for the same reasons as those used to reject claim 4. The argument is analogous to that presented above for claim 4, and therefore the rejection to claim 4 is equally applicable to claim 21.

22. In regards to claim 22, claim 22 is rejected for the same reasons as those used to reject claim 5. The argument is analogous to that presented above for claim 5, and therefore the rejection to claim 5 is equally applicable to claim 22.

23. In regards to claim 23, claim 23 is rejected for the same reasons as those used to reject claim 6. The argument is analogous to that presented above for claim 6, and therefore the rejection to claim 6 is equally applicable to claim 23.

Response to Arguments

24. Applicant's arguments filed 03/29/05 have been fully considered but they are not persuasive.

25. Applicant argues "The texture is a visual characteristic of the image vector that may appear as speckles and can be quantifiably analyzed to determine whether non-uniform rotation distortion ("NURD") exists. If it does, the texture will compress or expand, thus indicating nonuniformity in the generated image. The computation of an average frequency of the texture will be determine whether compression or expansion exists."

The term texture is not limited by a definition in the specification nor is it defined in the independent claims and therefore the examiner is free to interpret the word broadly.

26. Applicant further argues "Scampini discloses analyzing the signals from the transducer but dos not disclose, suggest, or teach analyzing the texture of the generated image."

The Doppler signals received back are images; the texture is the reflection point. This information is then used to correct for NURD. It is also pointed out that claim 1 reads "computing an average frequency of the texture" not "analyzing a texture of the generated image".

Conclusion

27. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L. Lavin whose telephone number is 571-272-7392. The examiner can normally be reached on M - F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLL

BRIAN WERNER
PRIMARY EXAMINER